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Indian Standard

METHOD FOR PREPARATION OF SOLID WASTE SAMPLE FOR CHEMICAL AND MICROBIOLOGICAL ANALYSIS

(First Reprint AUGUST 2009)

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METHOD FOR PREPARATION OF SOLID WASTE SAMPLE FOR CHEMICAL AND MICROBIOLOGICAL ANALYSIS

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METHOD FOR PREPARATION OF SOLID WASTE SAMPLE FOR CHEMICAL AND MICROBIOLOGICAL ANALYSIS

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 16 July 1979, after the draft finalized by the Solid Wastes Sectional Committee had been approved by the Chemical Division Council.

0.2 The term 'solid waste' as used in this standard refers to: (a) raw refuse that is delivered to a processing facility for disposal, (b) residues of the incineration process, and (c) refuse in various stages of composting. It is assumed that gross pieces of glass, ceramics, metal, plastics, leather components, etc, have been removed before submission to the laboratory.

0.3 In the preparation of this standard considerable assistance has been derived from the publication 'Physical, chemical and microbiological methods of solid waste testing' issued by the US Environmental Protection Agency, USA, 1973.

1. SCOPE

1.1 This standard prescribes a method for preparation of samples of solid wastes for chemical and microbiological analysis.

2. PREPARATION OF SAMPLE FOR ANALYSIS

2.1 The three basic operations required to prepare the sample for detailed analysis are drying, grinding or pulverizing, and mixing. The end products of these operations should be so thoroughly homogenized that portions weighing 100 to 200 mg may be extracted for analysis. The procedure for all types of organic materials is essentially similar, if compost samples have already been coarsely ground either in a hammer-mill or rasping device. The sample is dried before grinding. After grinding, it is subjected to mixing in a rotating mixer.

NOTE — When handling refuse, the analyst should use gloves, if possible of neoprene-coated canvas. He should also wear a face mask, such as a surgical mask, when preparing samples, especially when they are in finely divided form.

3. DRYING

3.1 A laboratory oven may be used for drying a small sample, and an industrial oven for a large sample. Weigh a pan, transfer the material to it and reweigh. Note the mass of the sample and dry in an oven at 70 to 75°C for 24 hours if the material is combustible, otherwise dry at 105 ± 1°C. Remove the sample and allow to cool, preferably in a desiccator. Weigh, and again place in the oven for 1 to 2 hours. Repeat the process of heating, cooling and weighing till the difference in mass between two successive weighings is less than one percent of the total previous loss in mass. Calculate the moisture content as percentage of the original mass. However, if microbiological tests are also to be conducted, drying shall be done at 40 to 50°C.

4. GRINDING

4.1 Waste material may contain glass, ferrous and non-ferrous metals, plastics, etc. Glass and ceramics may be separated by judicious sieving, plastics may be hand-picked as they are not degradable and interfere in the determination of carbon/nitrogen ratio, and ferrous metals may be removed by a strong magnet. After removal of these, proceed with grinding using a hammer-mill, grinding mill or pulverizer.

4.1.1 *Procedure for Combustibles* — Place the sample collection box under the grinding machine. Plug the lead into the power outlet. Open the cut-off in the dust collecting system. Oil the grinder bearings with engine oil. Put on personal safety equipment. Start the motor and feed the sample into the mill. Turn off grinder motor and turn off the blower. Clean out the grinder and add this material to the ground sample.

NOTE — It is advisable to wear a transparent plastics face shield while feeding the material into the grinder. The analyst should not use his hand to help push material into the grinder past the feed slot. Do not open any grinding device while it is running. If the grinder clogs, turn off the motor before cleaning the apparatus.

4.1.2 *Procedure for Compost* — Put a 2-mm sieve into the grinding mill. Open the cut-off in the dust collection duct. Position the container under the delivery spout. Replace the 2-mm sieve with a 1-mm sieve and regrind the sample. Brush out all inside surfaces of the mill into a separate container. Put this material through a micro mill. Add the product to the main sample.

4.1.3 *Procedure for Non-Combustibles* — Adjust the movable pulverizer plate to give a maximum size of about 2 mm. Put the sample through the pulverizer. Screen the ground material through 2-mm and 250-micron sieves. The material passing through 250-micron sieve is the required sample.

5. MIXING

5.1 The final mixing or homogenization is accomplished by transferring the sample to a suitable container that is not more than half filled by it. Close the container tightly, position it in a rotating mixer and allow to mix for not less than 2 hours. Reduce the mixed sample in size if desired, by passing it through a sample splitter or by quartering. Weigh all metal, ceramic, plastics and glass removed during processing.

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